AMD Projects

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CDC's Advanced Molecular Detection (AMD) initiative fosters scientific innovation to transform public health and protect people from disease threats.

AMD Projects: Predicting Nightmare Bacteria

Predicting transmission of CRE (carbapenem-resistant Enterobacteriaceae) to improve interventions

Carbapenem-resistant Enterobacteriaceae (CRE) are a family of germs that have become resistant to all or nearly all the antibiotics we have today. These "nightmare bacteria" contain jumping genes that spread resistance to a wide-variety of bacteria.

Healthy people typically do not get CRE infections—they usually happen to patients in hospitals, nursing homes, and other healthcare settings. Each year, about 600 people die because of infections caused by the two most common types of CRE: carbapenem-resistant *E. coli* and carbapenem-resistant *Klebsiella* species. Understanding more about how the germs spread will help keep CRE from spreading further. Improving our ability to detect CRE and identify characteristics of patients more likely to get a CRE infection also will improve protection for those at risk for these nearly untreatable infections.

CDC scientists will determine how the CRE bacteria and the resistant genes work together. They will create models, or a representation, to help determine how specific interventions would be successful in stopping the spread of CRE within a healthcare facility and a region. Ultimately, understanding how CRE spreads and clarifying the best approaches to keep it from spreading will help healthcare facilities reduce and prevent infections.

Bacteria that are resistant to carbapenems (Carbapenem-Resistant Enterobacteriaceae or CRE), which are considered 'last resort' antibiotics, produce a distinctive clover-leaf shaped growth pattern, as seen in this case.